

Virginia Curriculum Standards

and

Areas of Alignment with the

PSAT/NMSQT™, SAT® I and SAT II: Writing

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State Alignment Report Overview

This report is designed to detail the coverage of each state's standards on various College Board examinations. For this year's reports, the Virginia state standards were aligned with three College Board examinations. The three examinations are: 1) the PSAT/NMSQT examination, 2) SAT I: Reasoning Test, and 3) SAT II: Writing test.

For Virginia, the three College Board examinations were aligned to the state standards in Math and English.

The three examinations reviewed were designed to measure problem solving skills and higher order reasoning, which implicitly include an aggregate of skills. These higher order or aggregate skills are difficult to identify in the case of most state standards which normally describe individual skills or content areas. Also, due to the time limitations associated with a national standardized test, the SAT program can only assess a subset of most state standards. For Virginia, the three examinations do cover a significant percentage of the state standards reviewed. Following this page, the state standards for Virginia are specified. Following each benchmark, the College Board examinations that cover the benchmark are listed. If none of the examinations cover the specified standard, a classification of "Not covered" is given.

Moving forward, the College Board plans to expand its alignment work for next year and incorporate other examinations (such as other SAT II exams and Advanced Placement exams) into this alignment report. If you have any comments or questions regarding this report, please contact either your College Board regional office at the address below or contact Andrew Wiley at the College Board's New York City office.

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Virginia Learning Standards and Areas of Alignment with the PSAT/NMSQT, SAT I and SAT II

Overview of the tests

The **PSAT/NMSQT™**, **SAT I®: Reasoning Test (SAT I)**, and **SAT II: Subject Tests (SAT II)** are assessments given to students at the high school level.

The PSAT/NMSQT (**Preliminary SAT/National Merit Scholarship Qualifying Test**) is co-sponsored by the College Board and National Merit Scholarship Corporation. For many students, the PSAT/NMSQT is the first official step on the road to college. It assesses skills in Verbal, Math, and Writing developed through years of study in a wide range of courses as well as through experiences outside the classroom. Taking the PSAT/NMSQT is the best preparation for the SAT I: Reasoning Test and SAT II: Writing Test. The PSAT/NMSQT *Score Report Plus* gives students personalized feedback on their skills. Students can also review their answers since they get the correct answers and their responses to each test question, as well as their actual test booklet. The score report shows how a student's skill levels compare with other juniors or sophomores planning on going to college. Taking the PSAT/NMSQT offers juniors a chance to enter the competition for National Merit Scholarship Corporation scholarship programs. Students who take the PSAT/NMSQT have the opportunity to get educational and financial aid information from colleges, universities, and scholarship programs.

In 2002, 45% of PSAT/NMSQT test takers were sophomores or younger students. Younger test-takers have more time to develop the skills reported on *Score Report Plus* that they need to improve to succeed in high school and college. Students who take the test as sophomores need to take it again as juniors to qualify for National Merit scholarship programs. For more detailed information about the PSAT/NMSQT, including test format and recommended preparation, please visit collegeboard.com/psat or email questions to: psat@info.collegeboard.org.

The SAT I: Reasoning Test is an objective, standardized, three-hour test that measures verbal and mathematical reasoning abilities that students develop over time, both in and out of school. Many colleges and universities use the SAT for admission purposes because it helps to predict successful performance in college. These tests are intended to supplement, not replace, students' high school records and other information in assessing their readiness for college-level work. To ensure that the SAT is a valid measure of the skills and knowledge specified for the tests, as well as fair to all students, the SAT Program maintains rigorous standards for administering and scoring the tests and reporting test scores. Most students take the SAT at national administrations during their junior or senior year in high school. However, there are no age or grade restrictions for taking the test. For more detailed information about the Subject Tests including test purpose, format, and recommended preparation for each test, please visit collegeboard.com/SAT I Learning Center or email questions to: sat@info.collegeboard.org.

The SAT II: Subject Tests are designed to measure knowledge, and the ability to apply that knowledge, in specific subject areas. All Subject Tests are one-hour, multiple-choice tests. The **Writing Test** includes a 20-minute essay section and a 40-minute multiple-choice section. Students take the Subject Tests to demonstrate to colleges their mastery of specific subjects like English, history and social studies, mathematics science, and language. The tests are independent of any particular textbook or method of instruction. The content of the tests evolves to reflect current trends in high school curricula, but the types of questions change little from year to year. These tests are intended to supplement, not replace, students' high school records and other information in assessing their readiness for college-level work. Students are advised to take some Subject Tests (for example, Biology E/M and United States History) as soon as they complete a course of study in that subject, while the material is still fresh in their minds. Other Subject Tests, such as languages, require several years of study in the subject. Most students take the Subject Tests during their junior or senior year in high school. However, there are no age or grade restrictions for taking the test. For more detailed information about the Subject Tests including test purpose, format, and recommended preparation for each test, please visit [collegeboard.com/SAT II Learning Center](http://collegeboard.com/SAT-II-Learning-Center) or email questions to: sat@info.collegeboard.org.

English Language Arts

The **PSAT/NMSQT: Verbal and Writing Skills Tests**, **SAT I: Verbal Test**, and **SAT II: Writing Subject Test** together address the Virginia Learning Standards for English Language Arts. Since the PSAT/NMSQT, SAT I and SAT II tests are intended for high school students, the comparisons of the tests with the Virginia learning standards were done in relation to the Grades 9–12 standards. While standards from lower grades may not be directly measured by these tests, mastery of some of the materials in earlier grades helps prepare students for the material presented on the PSAT/NMSQT, SAT I and SAT II.

The **SAT I: Verbal Test** contains 38 “discrete” questions (19 sentence completions and 19 analogies); the **PSAT/NMSQT Verbal Test** contains 26 discrete questions (13 sentence completions and 13 analogies). The **SAT I** contains 40 critical reading questions based on passages; the **PSAT/NMSQT** contains 26. A careful balance of words, sentences, and passages drawn from a variety of subject areas helps to ensure that the tests are fair to all students regardless of their interests and backgrounds. No specialized knowledge in science, social studies, literature or other field is needed to answer verbal questions.

- *Sentence completion* questions measure students’ knowledge of the meanings of words and their ability to understand how the different parts of a sentence fit together logically. To answer a sentence completion question, students have to understand how the parts of a sentence relate to one another. Sentences are given with one or two words omitted. The correct answer is the word or set of words that, when placed in the blanks, *best* fits the meaning of the sentence as a whole.
- *Analogy* questions measure students’ knowledge of the meanings of words, their ability to see a relationship between a pair of words, and their ability to recognize a similar or parallel relationship in another pair of words. Each question consists of a pair of words in capital letters followed by five pairs of words; the correct answer is the pair whose relationship *best* matches that of the pair in capital letters.
- *Critical reading* questions measure students’ ability to read and think carefully about several reading passages. Passages are from 400 to about 850 words long. Some selections consist of a pair of related passages on a shared issue or theme. Reading selections are taken from a variety of fields, including social sciences, natural sciences, and the humanities. In addition, narrative passages are included, either fiction or nonfiction. Each passage or pair of related passages, including any introductions or footnotes, contains all the information needed to answer the questions. Critical reading questions may ask students to: determine the meaning of a word from its context in the

passage, demonstrate an understanding of significant information that is directly stated in the passage, identify cause and effect, relate parts of a passage to each other or to the whole, make inferences and recognize implications, follow the logic of an argument, or recognize consistency or inconsistency in an argument. Some of the questions based on a pair of passages will ask students to compare or contrast the two related passages.

The **PSAT/NMSQT Writing Skills Test** consists of 39 multiple-choice questions. It measures the students' ability to identify appropriate expressions in standard written English, detect faults in usage and structure, choose effective revisions in sentences and paragraphs, and recognize appropriate writing strategies. Questions measure language skills acquired throughout life, rather than knowledge acquired in a particular course. The test does not require students to define or use grammatical terms or to write an essay and it does not test spelling or capitalization. Questions relate to characteristics of effective writing. (Effective writing is consistent, expresses ideas logically, is precise and clear, and follows conventions.) There are three types of questions.

- *Identifying Sentence Errors* (19 questions) asks students to find errors in the sentences provided.
- *Improving Sentences* (14 questions) requires students to choose the best, most effective form of a sentence.
- *Improving Paragraphs* (6 questions) asks students to make choices about improving the logic, coherence, or organization in a flawed passage.

The **SAT II: Writing Subject Test** measures students' ability to express ideas effectively in standard written English, to recognize faults in usage and structure, and to use language with sensitivity to meaning. It is a one-hour test, with a 20-minute essay and 60 multiple-choice questions. (See description of PSAT/NMSQT Writing Skills test above.) The essay topic assigned will not require specialized knowledge in any particular academic discipline, but will give students an opportunity to use a broad range of knowledge and experiences in support of their discussion. The essays are read and scored by high school and college teachers who have experience with the quality of writing done by students at the end of high school or the beginning of college. Because essays written in 20 minutes on an assigned topic are not expected to be polished compositions, readers judge the quality of an essay by the total impression it creates. They take into account such aspects of writing as organization, choice of words, sentence structure, and punctuation as well as the appropriateness of examples and the logical presentation and development of ideas. Each essay is read and scored by two readers on a 6-point scale. The total writing sample score is the sum of the two readers' scores. It is weighted to equal one-third of the total SAT II: Writing Subject Test score. (If the two readers' scores are more than two points apart, a third reader is brought in.)

Virginia Learning Standards for English Language Arts Content Standard	Covered by
English -- Grade Level: 9 - 9	
Strand: Oral Language	
9.1 The student will plan, present, and critique dramatic readings of literary selections.	
• A) Choose a literary form for presentation, such as poems, monologues, scenes from plays, or stories.	Not covered
• B) Adapt presentation techniques to fit literary form.	Not covered
• C) Use verbal and nonverbal techniques for presentation.	Not covered
• D) Evaluate impact of presentation.	Not covered
English -- Grade Level: 9 - 9	
Strand: Oral Language	
9.2 The student will make planned oral presentations.	
• A) Include definitions to increase clarity.	Not covered
• B) Use relevant details to support main ideas.	Not covered
• C) Illustrate main ideas through anecdotes and examples.	Not covered
• D) Cite information sources.	Not covered
• E) Make impromptu responses to questions about presentation.	Not covered
• F) Use grammatically correct language including, vocabulary appropriate to topic, audience, and purpose.	Not covered
English -- Grade Level: 9 - 9	
Strand: Reading Analysis	
9.3 The student will read and analyze a variety of literature.	
• A) Identify format, text structure, and main idea.	PSAT/NMSQT SAT I: Verbal SAT II: Writing
• B) Identify the characteristics that distinguish literary forms.	Not covered
• C) Use literary terms in describing and analyzing selections.	PSAT/NMSQT SAT I: Verbal
• D) Explain the relationships between and among elements of literature: characters, plot, setting, tone, point of view, and theme.	SAT I: Verbal
• E) Explain the relationship between author's style and literary effect.	Not covered
• F) Describe the use of images and sounds to elicit the reader's emotions.	Not covered
• G) Explain the influence of historical context on the form, style, and point of view of a written work.	SAT I: Verbal
English -- Grade Level: 9 - 9	
Strand: Reading Analysis	

Virginia Learning Standards for English Language Arts Content Standard	Covered by
9.4 The student will read and analyze a variety of informational materials (manuals, textbooks, business letters, newspapers, brochures, reports, catalogs) and nonfiction materials including journals, essays, speeches, biographies, and autobiographies.	
• A) Identify a position/argument to be confirmed, disproved, or modified.	Not covered
• B) Evaluate clarity and accuracy of information.	SAT I: Verbal
• C) Synthesize information from sources and apply it in written and oral presentations.	Not covered
• D) Identify questions not answered by a selected text.	Not covered
• E) Extend general and specialized vocabulary through speaking, reading and writing.	PSAT/NMSQT SAT I: Verbal SAT II: Writing
English -- Grade Level: 9 - 9	
Strand: Reading Analysis	
9.5 The student will read dramatic selections.	
• A) Identify the two basic parts of drama: staging and scripting.	Not covered
• B) Compare and contrast the elements of character, setting, and plot in one-act plays and full-length plays.	Not covered
• C) Describe how stage directions help the reader understand a play's setting, mood, characters, plot, and theme.	Not covered
English -- Grade Level: 9 - 9	
Strand: Writing	
9.6 The student will develop narrative, expository, and informational writings to inform, explain, analyze, or entertain.	
• A) Generate, gather, and organize ideas for writing.	Not covered
• B) Plan and organize writing to address a specific audience and purpose.	Not covered
• C) Communicate clearly the purpose of the writing.	SAT II: Writing
• D) Write clear, varied sentences.	SAT II: Writing
• E) Use specific vocabulary and information.	SAT II: Writing
• F) Arrange paragraphs into a logical progression.	PSAT/NMSQT SAT II: Writing
• G) Revise writing for clarity.	Not covered
• H) Proofread and prepare final product for intended audience and purpose.	PSAT/NMSQT
English -- Grade Level: 9 - 9	
Strand: Writing	
9.7 The student will edit writing for correct use of language, sentence formation, punctuation, capitalization, and spelling as part of the writing process.	
• A) Use and apply rules for the parts of a sentence including: subject/verb, direct/indirect object and predicate nominative/predicate adjective.	PSAT/NMSQT SAT II: Writing

Virginia Learning Standards for English Language Arts Content Standard	Covered by
• B) Use parallel structures across sentences and paragraphs.	PSAT/NMSQT SAT II: Writing
• C) Use appositives and main/subordinate clauses.	PSAT/NMSQT SAT II: Writing
• D) Use commas and semicolons to distinguish and divide main and subordinate clauses.	PSAT/NMSQT SAT II: Writing
English -- Grade Level: 9 - 9	
Strand: Research	
9.8 The student will credit the sources of both quoted and paraphrased ideas.	
• A) Define the meaning and consequences of plagiarism.	Not covered
• B) Distinguish one's own ideas from information created or discovered by others.	Not covered
• C) Use a style sheet, including MLA (Modern Language Association) or APA (American Psychological Association), for citing secondary sources.	Not covered
English -- Grade Level: 9 - 9	
Strand: Research	
9.9 The student will use print, electronic databases, and online resources to access information.	
• A) Identify key terms specific to research tools and processes.	Not covered
• B) Narrow the focus of a search.	Not covered
• C) Scan and select resources.	Not covered
• D) Distinguish between reliable and questionable Internet sources and apply responsible use of technology.	Not covered
English -- Grade Level: 10 - 10	
Strand: Oral Language	
10.1 The student will participate in and report small-group learning activities.	
• A) Assume responsibility for specific group tasks.	Not covered
• B) Participate in the preparation of an outline or summary of the group activity.	Not covered
• C) Include all group members in oral presentation.	Not covered
• D) Use grammatically correct language including, vocabulary appropriate to the topic, audience, and purpose.	Not covered
English -- Grade Level: 10 - 10	
Strand: Oral Language	
10.2 The student will critique oral reports of small-group learning activities.	
• A) Evaluate one's own role in preparation and delivery of oral reports.	Not covered
• B) Evaluate effectiveness of group process in preparation and delivery of oral reports.	Not covered
English -- Grade Level: 10 - 10	
Strand: Reading Analysis	
10.3 The student will read, comprehend, and critique literary works.	
• A) Identify text organization and structure.	SAT I: Verbal

Virginia Learning Standards for English Language Arts Content Standard	Covered by
• B) Identify main and supporting ideas.	PSAT/NMSQT SAT I: Verbal SAT II: Writing
• C) Make predictions, draw inferences, and connect prior knowledge to support reading comprehension.	PSAT/NMSQT SAT I: Verbal
• D) Explain similarities and differences of techniques and literary forms represented in the literature of different cultures.	PSAT/NMSQT
• E) Identify universal themes prevalent in the literature of all cultures.	PSAT/NMSQT
• F) Examine a literary selection from several critical perspectives.	Not covered
English -- Grade Level: 10 - 10	
Strand: Reading Analysis	
10.4 The student will read and interpret informational materials.	
• A) Analyze and apply the information contained in warranties, contracts, job descriptions, technical descriptions, and other informational sources, including labels, warnings, manuals, directions, applications, and forms, to complete specific tasks.	PSAT/NMSQT SAT I: Verbal
• B) Skim manuals or informational sources to locate information.	SAT I: Verbal
• C) Compare and contrast product information contained in advertisements with instruction manuals and warranties.	Not covered
English -- Grade Level: 10 - 10	
Strand: Reading Analysis	
10.5 The student will read and analyze a variety of poetry.	
• A) Compare and contrast the use of rhyme, rhythm, and sound to convey a message.	Not covered
• B) Compare and contrast the ways in which poets use techniques to evoke emotion in the reader.	Not covered
• C) Interpret and paraphrase the meaning of selected poems.	Not covered
English -- Grade Level: 10 - 10	
Strand: Reading Analysis	
10.6 The student will read and critique dramatic selections.	
• A) Explain the use of asides, soliloquies, and monologues in the development of a single character.	Not covered
• B) Compare and contrast character development in a play to characterization in other literary forms.	Not covered
English -- Grade Level: 10 - 10	
Strand: Writing	
10.7 The student will develop a variety of writings with an emphasis on exposition.	
• A) Generate, gather, plan and organize ideas for writing.	Not covered
• B) Elaborate ideas clearly through word choice and vivid description.	Not covered
• C) Write clear, varied sentences.	SAT II: Writing
• D) Organize ideas into a logical sequence.	PSAT/NMSQT SAT II: Writing

Virginia Learning Standards for English Language Arts Content Standard	Covered by
• E) Revise writing for clarity and content of presentation.	Not covered
• F) Proofread and prepare final product for intended audience and purpose.	PSAT/NMSQT
English -- Grade Level: 10 - 10	
Strand: Writing	
10.8 The student will edit writing for correct grammar, capitalization, punctuation, spelling, sentence structure, and paragraphing.	
• A) Use a style manual, including MLA (Modern Language Association) or APA (American Psychological Association), to apply rule for punctuation and formatting of direct quotations.	Not covered
• B) Apply rules governing use of the colon.	PSAT/NMSQT SAT II: Writing
• C) Distinguish between active voice and passive voice.	PSAT/NMSQT SAT II: Writing
English -- Grade Level: 10 - 10	
Strand: Writing	
10.9 The student will critique professional and peer writing.	
• A) Analyze the writing of others.	Not covered
• B) Describe how the author accomplishes the intended purpose of a writing.	Not covered
• C) Suggest how writing might be improved.	Not covered
English -- Grade Level: 10 - 10	
Strand: Writing	
10.10 The student will use writing to interpret, analyze, and evaluate ideas.	
• A) Explain concepts contained in literature and other disciplines.	Not covered
• B) Translate concepts into simpler or more easily understood terms.	Not covered
English -- Grade Level: 10 - 10	
Strand: Research	
10.11 The student will collect, evaluate, organize, and present information.	
• A) Organize information from a variety of sources.	Not covered
• B) Develop the central idea or focus.	Not covered
• C) Verify the accuracy and usefulness of information.	SAT I: Verbal
• D) Credit sources for both quoted and paraphrased ideas.	Not covered
• E) Present information in an appropriate format, such as oral presentations, written reports, or visual products.	Not covered
• F) Use technology to access information, organize ideas, and develop writing.	Not covered
English -- Grade Level: 11 - 11	
Strand: Oral Language	
11.1 The student will make informative and persuasive presentations.	
• A) Gather and organize evidence to support a position.	Not covered

Virginia Learning Standards for English Language Arts Content Standard	Covered by
• B) Present evidence clearly and convincingly.	Not covered
• C) Support and defend ideas in public forums.	Not covered
• D) Use grammatically correct language, including vocabulary appropriate to the topic, audience, and purpose.	Not covered
English -- Grade Level: 11 - 11	
Strand: Oral Language	
11.2 The student will analyze and evaluate informative and persuasive presentations.	
• A) Critique the accuracy, relevance, and organization of evidence.	Not covered
• B) Critique the clarity and effectiveness of delivery.	Not covered
English -- Grade Level: 11 - 11	
Strand: Reading Analysis	
11.3 The student will read and analyze relationships among American literature, history, and culture.	
• A) Describe contributions of different cultures to the development of American literature.	SAT I: Verbal
• B) Compare and contrast the development of American literature in its historical context.	Not covered
• C) Discuss American literature as it reflects traditional and contemporary themes, motifs, universal characters, and genres.	PSAT/NMSQT
• D) Describe how use of context and language structures conveys an author's intent and viewpoint in contemporary and historical essays, speeches, and critical reviews.	Not covered
English -- Grade Level: 11 - 11	
Strand: Reading Analysis	
11.4 The student will read and analyze a variety of informational material.	
• A) Use information from texts to clarify or refine understanding of academic concepts.	PSAT/NMSQT SAT I: Verbal
• B) Read and follow directions to complete an application for college admission, for a scholarship, or for employment.	PSAT/NMSQT SAT I: Verbal
• C) Apply concepts and use vocabulary in informational and technical materials to complete a task.	Not covered
• D) Generalize ideas from selections to make predictions about other texts.	Not covered
• E) Analyze information from a text to draw conclusions.	PSAT/NMSQT SAT I: Verbal
English -- Grade Level: 11 - 11	
Strand: Reading Analysis	
11.5 The student will read and critique a variety of poetry.	
• A) Analyze the poetic elements of contemporary and traditional poems.	Not covered
• B) Identify the poetic elements and techniques that are most appealing and that make poetry enjoyable.	Not covered
• C) Compare and contrast the works of contemporary and past American poets.	Not covered
English -- Grade Level: 11 - 11	
Strand: Reading Analysis	

Virginia Learning Standards for English Language Arts Content Standard	Covered by
11.6 The student will read and critique a variety of dramatic selections.	
• A) Describe the dramatic conventions or devices used by playwrights to present ideas.	Not covered
• B) Compare and evaluate adaptations and interpretations of script for stage, film, or television.	Not covered
• C) Explain the use of verbal, situational, and dramatic irony.	PSAT/NMSQT SAT I: Verbal
English -- Grade Level: 11 - 11	
Strand: Writing	
11.7 The student will develop a variety of writings with an emphasis on persuasion.	
• A) Generate, gather, plan, and organize ideas for writing.	Not covered
• B) Develop a focus for writing.	Not covered
• C) Evaluate and cite applicable information.	Not covered
• D) Organize ideas into a logical sequence.	PSAT/NMSQT SAT II: Writing
• E) Elaborate ideas clearly and accurately.	Not covered
• F) Adapt content, vocabulary, voice, and tone to audience, purpose, and situation.	Not covered
• G) Revise writing for accuracy and depth of information.	Not covered
• H) Proofread final copy and prepare document for intended audience or purpose.	PSAT/NMSQT
English -- Grade Level: 11 - 11	
Strand: Writing	
11.8 The student will edit writing for correct use of language, sentence formation, punctuation, capitalization, and spelling as part of the writing process.	
• A) Use a style manual, including Modern Language Association (MLA) or American Psychological Association (APA), for producing research projects.	Not covered
• B) Apply rules governing the use of verbals (gerunds, infinitives and participles) and verbal phrases.	SAT II: Writing
• C) Adjust sentences and paragraph structures for a variety of purposes and audiences.	Not covered
English -- Grade Level: 11 - 11	
Strand: Writing	
11.9 The student will write, revise, and edit personal, professional, and informational correspondence to a standard acceptable in the workplace and higher education.	
• A) Apply a variety of planning strategies to generate and organize ideas.	Not covered
• B) Organize information to support the purpose of the writing.	Not covered
• C) Present information in a logical manner.	PSAT/NMSQT SAT II: Writing
• D) Revise writing for clarity.	Not covered
• E) Use technology to access information, plan a composition, and develop writing.	PSAT/NMSQT
English -- Grade Level: 11 - 11	

Virginia Learning Standards for English Language Arts Content Standard	Covered by
Strand: Research	
11.10 The student will analyze, evaluate, synthesize, and organize information from a variety of sources to produce a research product.	
• A) Narrow a topic.	Not covered
• B) Develop a plan for research.	Not covered
• C) Collect information to support a thesis.	Not covered
• D) Evaluate quality and accuracy of information.	SAT I: Verbal
• E) Synthesize information in a logical sequence.	Not covered
• F) Document sources of information using a style sheet format, including MLA (Modern Language Association) or American Psychological Association (APA).	Not covered
• G) Edit writing for clarity of content and effect.	PSAT/NMSQT
• H) Edit copy for grammatically correct use of language, spelling, punctuation, and capitalization.	PSAT/NMSQT
• I) Proofread final copy and prepare for publication or other use.	PSAT/NMSQT
• J) Use technology to access information, organize ideas, and develop writing.	PSAT/NMSQT
English -- Grade Level: 12 - 12	
Strand: Oral Language	
12.1 The student will make a 5-10 minute formal oral presentation.	
• A) Choose the purpose of the presentation: to defend a position, to entertain an audience, or to explain information.	Not covered
• B) Use a well-structured narrative or logical argument.	Not covered
• C) Use details, illustrations, statistics, comparisons, and analogies to support purposes.	Not covered
• D) Use visual aids or technology to support presentation.	Not covered
• E) Use grammatically correct language, including vocabulary appropriate to the topic, audience, and purpose.	Not covered
English -- Grade Level: 12 - 12	
Strand: Oral Language	
12.2 The student will analyze and evaluate formal presentations.	
• A) Critique relationships among purpose, audience, and content of presentations.	Not covered
• B) Critique effectiveness of presentations.	Not covered
English -- Grade Level: 12 - 12	
Strand: Reading Analysis	
12.3 The student will read and analyze the development of British literature and literature of other cultures.	
• A) Recognize major literary forms and their elements.	SAT I: Verbal
• B) Recognize the characteristics of major chronological eras.	Not covered
• C) Relate literary works and authors to major themes and issues of their eras.	PSAT/NMSQT
English -- Grade Level: 12 - 12	
Strand: Reading Analysis	

Virginia Learning Standards for English Language Arts Content Standard	Covered by
12.4 The student will read and analyze a variety of informational materials, including electronic resources.	
• A) Identify formats common to new publications and information resources.	PSAT/NMSQT SAT I: Verbal SAT II: Writing
• B) Recognize and apply specialized informational vocabulary.	PSAT/NMSQT SAT I: Verbal SAT II: Writing
• C) Evaluate a product based on analysis of the accompanying warranty and instruction manual.	Not covered
• D) Evaluate the quality of informational and technical materials.	SAT I: Verbal
English -- Grade Level: 12 - 12	
Strand: Reading Analysis	
12.5 The student will read and critique a variety of poetry.	
• A) Explain how the choice of words in a poem creates tone and voice.	PSAT/NMSQT SAT I: Verbal
• B) Explain how the sound of a poem (rhyme, rhythm, onomatopoeia, repetition, alliteration, assonance, and parallelism) supports the subject and mood.	PSAT/NMSQT SAT I: Verbal
• C) Explain how imagery and figures of speech (personification, simile, metaphor) appeal to the reader's senses and experience.	Not covered
• D) Compare and contrast traditional and contemporary works of poets from many cultures.	Not covered
English -- Grade Level: 12 - 12	
Strand: Reading Analysis	
12.6 The student will read and critique dramatic selections from a variety of authors.	
• A) Describe the conflict, plot, climax, and setting.	SAT I: Verbal
• B) Compare and contrast ways in which character, scene, dialogue and staging contribute to the theme and the dramatic effect.	Not covered
• C) Identify the most effective elements of selected plays.	Not covered
• D) Compare and contrast dramatic elements of plays from American, British, and other cultures.	Not covered
English -- Grade Level: 12 - 12	
Strand: Writing	
12.7 The student will develop expository and informational writings.	
• A) Generate, gather, and organize ideas for writing.	Not covered
• B) Consider audience and purpose when planning for writing.	Not covered
• C) Write analytically about literary, informational, and visual materials.	Not covered
• D) Elaborate ideas clearly and accurately.	Not covered
• E) Revise writing for depth of information and technique of presentation.	Not covered
• F) Apply grammatical conventions to edit writing for correct use of language, spelling, punctuation, and capitalization.	PSAT/NMSQT

Virginia Learning Standards for English Language Arts Content Standard	Covered by
• G) Proofread final copy and prepare document for publication or other use.	PSAT/NMSQT
English -- Grade Level: 12 - 12	
Strand: Research	
12.8 The student will write documented research papers.	
• A) Identify and understand the ethical issues of research and documentation.	Not covered
• B) Evaluate the accuracy and usefulness of information.	Not covered
• C) Synthesize information to support the thesis.	Not covered
• D) Present information in a logical manner.	Not covered
• E) Cite sources of information using a standard method of documentation, including Modern Language Association (MLA) or American Psychological Association (APA).	Not covered
• F) Edit copies for correct use of language, capitalization, punctuation, and spelling in final copies.	PSAT/NMSQT
• G) Proofread final copy and prepare document for publication or other use.	PSAT/NMSQT

Mathematics

The **PSAT/NMSQT: Math** and **SAT I: Math** together address the Virginia Learning Standards for Mathematics. Since the PSAT/NMSQT and SAT I are intended for high school students, the comparisons of the tests with the Virginia learning standards were done in relation to the Grade 10 standards. While standards from lower grades may not be directly measured by these tests, mastery of some of the materials in earlier grades helps prepare students for the material presented on the PSAT/NMSQT and SAT I.

The **PSAT/NMSQT** and **SAT I** math tests consist of three types of questions: standard five-choice multiple-choice questions (35 questions for SAT I; 20 for PSAT/NMSQT), four-choice quantitative comparison questions that emphasize the concepts of equalities, inequalities, and estimation (15 questions for SAT I; 12 for PSAT/NMSQT), and student-produced response questions that provide no answer choices (10 questions for SAT; 8 for PSAT/NMSQT). Some questions are like the questions that appear in math textbooks. Others ask students to do original thinking. The questions are designed for students who have had a year of algebra and some geometry. Many of the geometric ideas involved are usually taught in the elementary and junior high years, but a few of the questions involve topics that are first taught in high school geometry. Most of the questions are classified as arithmetic, algebra, or geometry, and there are about the same number of questions of each type. Students are not expected to memorize formulas; commonly used formulas are provided in the test book. Space for scratchwork is provided around each question; students are not expected to do all of the reasoning and figuring in their heads.

When the **PSAT/NMSQT** and **SAT I** math specifications were revised in 1994, the NCTM Standards were kept closely in mind. These tests now include some non-multiple choice questions. Students mark their answers on a special grid. These tests also now permit and encourage the appropriate use of calculators as an aid in solving problems. Students are permitted to use almost any calculator, except those with QWERTY keyboards and those that “talk”. Students can use their calculators to test and explore and to carry out incidental computations needed to solve some problems. Questions that test only basic computation are generally avoided, as are questions that give an unfair advantage to students who have more powerful calculators.

Virginia Learning Standards for Mathematics Content Standard	Covered by
Mathematics -- Grade Level: 9 - 12	
Algebra I	
<ul style="list-style-type: none"> • A.1 The student will solve multistep linear equations and inequalities in one variable, solve literal equations (formulas) for a given variable, and apply these skills to solve practical problems. Graphing calculators will be used to confirm algebraic solutions. 	PSAT/NMSQT
<ul style="list-style-type: none"> • A.2 The student will represent verbal quantitative situations algebraically and evaluate these expressions for given replacement values of the variables. Students will choose an appropriate computational technique, such as mental mathematics, calculator, or paper and pencil. 	PSAT/NMSQT
<ul style="list-style-type: none"> • A.3 The student will justify steps used in simplifying expressions and solving equations and inequalities. Justifications will include the use of concrete objects; pictorial representations; and the properties of real numbers, equality, and inequality. 	Not covered
<ul style="list-style-type: none"> • A.4 The student will use matrices to organize and manipulate data, including matrix addition, subtraction, and scalar multiplication. Data will arise from business, industrial, and consumer situations. 	Not covered
<ul style="list-style-type: none"> • A.5 The student will create and use tabular, symbolic, graphical, verbal, and physical representations to analyze a given set of data for the existence of a pattern, determine the domain and range of relations, and identify the relations that are functions. 	Not covered
<ul style="list-style-type: none"> • A.6 The student will select, justify, and apply an appropriate technique to graph linear functions and linear inequalities in two variables. Techniques will include slope-intercept, x- and y-intercepts, graphing by transformation, and the use of the graphing calculator. 	Not covered
<ul style="list-style-type: none"> • A.7 The student will determine the slope of a line when given an equation of the line, the graph of the line, or two points on the line. Slope will be described as rate of change and will be positive, negative, zero, or undefined. The graphing calculator will be used to investigate the effect of changes in the slope on the graph of the line. 	PSAT/NMSQT
<ul style="list-style-type: none"> • A.8 The student will write an equation of a line when given the graph of the line, two points on the line, or the slope and a point on the line. 	PSAT/NMSQT
<ul style="list-style-type: none"> • A.9 The student will solve systems of two linear equations in two variables both algebraically and graphically and apply these techniques to solve practical problems. Graphing calculators will be used both as a primary tool for solution and to confirm an algebraic solution. 	Not covered
<ul style="list-style-type: none"> • A.10 The student will apply the laws of exponents to perform operations on expressions with integral exponents, using scientific notation when appropriate. 	Not covered
<ul style="list-style-type: none"> • A.11 The student will add, subtract, and multiply polynomials and divide polynomials with monomial divisors, using concrete objects, pictorial and area representations, and algebraic manipulations. 	PSAT/NMSQT SAT I: Math
<ul style="list-style-type: none"> • A.12 The student will factor completely first- and second-degree binomials and trinomials in one or two variables. The graphing calculator will be used as a tool for factoring and for confirming algebraic factorizations. 	PSAT/NMSQT SAT I: Math

Virginia Learning Standards for Mathematics Content Standard	Covered by
• A.13 The student will express the square root of a whole number in simplest radical form and approximate square roots to the nearest tenth.	Not covered
• A.14 The student will solve quadratic equations in one variable both algebraically and graphically. Graphing calculators will be used both as a primary tool in solving problems and to verify algebraic solutions.	Not covered
• A.15 The student will, given a rule, find the values of a function for elements in its domain and locate the zeros of the function both algebraically and with a graphing calculator. The value of $f(x)$ will be related to the ordinate on the graph.	Not covered
• A.16 The student will, given a set of data points, write an equation for a line of best fit and use the equation to make predictions.	Not covered
• A.17 The student will compare and contrast multiple one-variable data sets, using statistical techniques that include measures of central tendency, range, and box-and-whisker graphs.	Not covered
• A.18 The student will analyze a relation to determine whether a direct variation exists and represent it algebraically and graphically, if possible.	Not covered
Mathematics -- Grade Level: 9 - 12	
Geometry	
G.1 The student will construct and judge the validity of a logical argument consisting of a set of premises and a conclusion. This will include	
• A) identifying the converse, inverse, and contrapositive of a conditional statement.	Not covered
• B) translating a short verbal argument into symbolic form.	Not covered
• C) using Venn diagrams to represent set relationships.	PSAT/NMSQT SAT I: Math
• D) using deductive reasoning, including the law of syllogism.	SAT I: Math
Mathematics -- Grade Level: 9 - 12	
Geometry	
G.2 The student will use pictorial representations, including computer software, constructions, and coordinate methods, to solve problems involving symmetry and transformation. This will include	
• A) investigating and using formulas for finding distance, midpoint, and slope.	SAT I: Math
• B) investigating symmetry and determining whether a figure is symmetric with respect to a line or a point.	SAT I: Math
• C) determining whether a figure has been translated, reflected, or rotated.	SAT I: Math
• G.3 The student will solve practical problems involving complementary, supplementary, and congruent angles that include vertical angles, angles formed when parallel lines are cut by a transversal, and angles in polygons.	SAT I: Math
• G.4 The student will use the relationships between angles formed by two lines cut by a transversal to determine if two lines are parallel and verify, using algebraic and coordinate methods as well as deductive proofs.	SAT I: Math
• G.5 a) The student will investigate and identify congruence and similarity relationships between triangles.	SAT I: Math

Virginia Learning Standards for Mathematics Content Standard	Covered by
<ul style="list-style-type: none"> • G.5 b) The student will prove two triangles are congruent or similar, given information in the form of a figure or statement, using algebraic and coordinate as well as deductive proofs. 	SAT I: Math
<ul style="list-style-type: none"> • G.6 The student, given information concerning the lengths of sides and/or measures of angles, will apply the triangle inequality properties to determine whether a triangle exists and to order sides and angles. These concepts will be considered in the context of practical situations. 	PSAT/NMSQT SAT I: Math
<ul style="list-style-type: none"> • G.7 The student will solve practical problems involving right triangles by using the Pythagorean Theorem, properties of special right triangles, and right triangle trigonometry. Solutions will be expressed in radical form or as decimal approximations. 	PSAT/NMSQT SAT I: Math
<ul style="list-style-type: none"> • G.8 The student will a) investigate and identify properties of quadrilaterals involving opposite sides and angles, consecutive sides and angles, and diagonals; b) prove these properties of quadrilaterals, using algebraic and coordinate methods as well as deductive reasoning; c) use properties of quadrilaterals to solve practical problems. 	PSAT/NMSQT SAT I: Math
<ul style="list-style-type: none"> • G.9 The student will use measures of interior and exterior angles of polygons to solve problems. Tessellations and tiling problems will be used to make connections to art, construction, and nature. 	PSAT/NMSQT SAT I: Math
<ul style="list-style-type: none"> • G.10 The student will investigate and solve practical problems involving circles, using properties of angles, arcs, chords, tangents, and secants. Problems will include finding arc length and the area of a sector, and may be drawn from applications of architecture, art, and construction. 	PSAT/NMSQT SAT I: Math
<ul style="list-style-type: none"> • G.11 The student will construct a line segment congruent to a given line segment, the bisector of a line segment, a perpendicular to a given line from a point not on the line, a perpendicular to a given line at a point on the line, the bisector of a given angle, and an angle congruent to a given angle. 	Not covered
<ul style="list-style-type: none"> • G.12 The student will make a model of a three-dimensional figure from a two-dimensional drawing and make a two-dimensional representation of a three-dimensional object. Models and representations will include scale drawings, perspective drawings, blueprints, or computer simulations. 	Not covered
<ul style="list-style-type: none"> • G.13 The student will use formulas for surface area and volume of three-dimensional objects to solve practical problems. Calculators will be used to find decimal approximations for results. 	PSAT/NMSQT SAT I: Math
<ul style="list-style-type: none"> • G.14 a) The student will use proportional reasoning to solve practical problems, given similar geometric objects. 	PSAT/NMSQT SAT I: Math
<ul style="list-style-type: none"> • G.14 b) The student will determine how changes in one dimension of an object affect area and/or volume of the object. 	Not covered
Mathematics -- Grade Level: 9 - 12	
Algebra II	
<ul style="list-style-type: none"> • All.1 The student will identify field properties, axioms of equality and inequality, and properties of order that are valid for the set of real numbers and its subsets, complex numbers, and matrices. 	PSAT/NMSQT SAT I: Math
<ul style="list-style-type: none"> • All.2 The student will add, subtract, multiply, divide, and simplify rational expressions, including complex fractions. 	PSAT/NMSQT
<ul style="list-style-type: none"> • All.3 a) The student will add, subtract, multiply, divide, and simplify radical expressions containing positive rational numbers and variables and expressions containing rational exponents. 	Not covered

Virginia Learning Standards for Mathematics Content Standard	Covered by
• All.3 b) The student will write radical expressions as expressions containing rational exponents and vice versa.	Not covered
• All.4 The student will solve absolute value equations and inequalities graphically and algebraically. Graphing calculators will be used as a primary method of solution and to verify algebraic solutions.	PSAT/NMSQT SAT I: Math
• All.5 The student will identify and factor completely polynomials representing the difference of squares, perfect square trinomials, the sum and difference of cubes, and general trinomials.	PSAT/NMSQT SAT I: Math
• All.6 The student will select, justify, and apply a technique to solve a quadratic equation over the set of complex numbers. Graphing calculators will be used for solving and for confirming the algebraic solutions.	Not covered
• All.7 The student will solve equations containing rational expressions and equations containing radical expressions algebraically and graphically. Graphing calculators will be used for solving and for confirming the algebraic solutions.	PSAT/NMSQT SAT I: Math
• All.8 The student will recognize multiple representations of functions (linear, quadratic, absolute value, step, and exponential functions) and convert between a graph, a table, and symbolic form. A transformational approach to graphing will be employed through the use of graphing calculators.	Not covered
• All.9 The student will find the domain, range, zeros, and inverse of a function; the value of a function for a given element in its domain; and the composition of multiple functions. Functions will include exponential, logarithmic, and those that have domains and ranges that are limited and/or discontinuous. The graphing calculator will be used as a tool to assist in investigation of functions.	Not covered
• All.10 The student will investigate and describe through the use of graphs the relationships between the solution of an equation, zero of a function, x-intercept of a graph, and factors of a polynomial expression.	Not covered
• All.11 The student will use matrix multiplication to solve practical problems. Graphing calculators or computer programs with matrix capabilities will be used to find the product.	PSAT/NMSQT
• All.12 The student will represent problem situations with a system of linear equations and solve the system, using the inverse matrix method. Graphing calculators or computer programs with matrix capability will be used to perform computations.	SAT I: Math
• All.13 The student will solve practical problems, using systems of linear inequalities and linear programming, and describe the results both orally and in writing. A graphing calculator will be used to facilitate solutions to linear programming problems.	SAT I: Math
• All.14 The student will solve nonlinear systems of equations, including linear-quadratic and quadratic-quadratic, algebraically and graphically. The graphing calculator will be used as a tool to visualize graphs and predict the number of solutions.	Not covered
• All.15 The student will recognize the general shape of polynomial, exponential, and logarithmic functions. The graphing calculator will be used as a tool to investigate the shape and behavior of these functions.	Not covered
• All.16 The student will investigate and apply the properties of arithmetic and geometric sequences and series to solve practical problems, including writing the first n terms, finding the n th term, and evaluating summation formulas. Notation will include Σ (summation symbol) and a^n .	PSAT/NMSQT SAT I: Math

Virginia Learning Standards for Mathematics Content Standard	Covered by
<ul style="list-style-type: none"> All.17 The student will perform operations on complex numbers and express the results in simplest form. Simplifying results will involve using patterns of the powers of i. 	Not covered
<ul style="list-style-type: none"> All.18 The student will identify conic sections (circle, ellipse, parabola, and hyperbola) from his/her equations. Given the equations in (h, k) form, the student will sketch graphs of conic sections, using transformations. 	Not covered
<ul style="list-style-type: none"> All.19 The student will collect and analyze data to make predictions and solve practical problems. Graphing calculators will be used to investigate scatterplots and to determine the equation for a curve of best fit. Models will include linear, quadratic, exponential, and logarithmic functions. 	Not covered
<ul style="list-style-type: none"> All.20 The student will identify, create, and solve practical problems involving inverse variation and a combination of direct and inverse variations. 	Not covered
Mathematics -- Grade Level: 9 - 12	
Trigonometry	
<ul style="list-style-type: none"> T.1 The student will use the definitions of the six trigonometric functions to find the sine, cosine, tangent, cotangent, secant, and cosecant of an angle in standard position, given a point, other than the origin, on the terminal side of the angle. Circular function definitions will be connected with trigonometric function definitions. 	Not covered
<ul style="list-style-type: none"> T.2 The student, given the value of one trigonometric function, will find the values of the other trigonometric functions. Properties of the unit circle and definitions of circular functions will be applied. 	Not covered
<ul style="list-style-type: none"> T.3 The student will find without the aid of a calculating utility the values of the trigonometric functions of the special angles and their related angles as found in the unit circle. This will include converting radians to degrees and vice versa. 	Not covered
<ul style="list-style-type: none"> T.4 The student will find with the aid of a calculator the value of any trigonometric function and inverse trigonometric function. 	Not covered
<ul style="list-style-type: none"> T.5 The student will verify basic trigonometric identities and make substitutions, using the basic identities. 	
Mathematics -- Grade Level: 9 - 12	
Trigonometry	
T.6 The student, given one of the six trigonometric functions in standard form (e.g., $y = A \sin (Bx + C) + D$, where A , B , C , and D are real numbers), will	Not covered
<ul style="list-style-type: none"> T.6 a) state the domain and the range of the function. 	Not covered
<ul style="list-style-type: none"> T.6 b) determine the amplitude, period, phase shift, and vertical shift. 	Not covered
<ul style="list-style-type: none"> T.6 c) sketch the graph of the function by using transformations for at least a one-period interval. 	Not covered
Mathematics -- Grade Level: 9 - 12	
Trigonometry	
<ul style="list-style-type: none"> T.7 The student will identify the domain and range of the inverse trigonometric functions and recognize the graphs of these functions. Restrictions on the domains of the inverse trigonometric functions will be included. 	Not covered

Virginia Learning Standards for Mathematics Content Standard	Covered by
<ul style="list-style-type: none"> • T.8 The student will solve trigonometric equations that include both infinite solutions and restricted domain solutions and solve basic trigonometric inequalities. Graphing utilities will be used to solve equations, check for reasonableness of results, and verify algebraic solutions. 	Not covered
<ul style="list-style-type: none"> • T.9 The student will identify, create, and solve practical problems involving triangles. Techniques will include using the trigonometric functions, the Pythagorean Theorem, the Law of Sines, and the Law of Cosines. 	PSAT/NMSQT SAT I: Math
Mathematics -- Grade Level: 9 - 12	
Algebra II and Trigonometry	
<ul style="list-style-type: none"> • AII/T.1 The student will identify field properties, axioms of equality and inequality, and properties of order that are valid for the set of real numbers and its subsets, complex numbers, and matrices. 	PSAT/NMSQT SAT I: Math
<ul style="list-style-type: none"> • AII/T.2 The student will add, subtract, multiply, divide, and simplify rational expressions, including complex fractions. 	PSAT/NMSQT
<ul style="list-style-type: none"> • AII/T.3 a) The student will add, subtract, multiply, divide, and simplify radical expressions containing positive rational numbers and variables and expressions containing rational exponents. 	Not covered
<ul style="list-style-type: none"> • AII/T.3 b) The student will write radical expressions as expressions containing rational exponents and vice versa. 	Not covered
<ul style="list-style-type: none"> • AII/T.4 The student will solve absolute value equations and inequalities graphically and algebraically. Graphing calculators will be used as a primary method of solution and to verify algebraic solutions. 	PSAT/NMSQT SAT I: Math
<ul style="list-style-type: none"> • AII/T.5 The student will identify and factor completely polynomials representing the difference of squares, perfect square trinomials, the sum and difference of cubes, and general trinomials. 	PSAT/NMSQT SAT I: Math
<ul style="list-style-type: none"> • AII/T.6 The student will select, justify, and apply a technique to solve a quadratic equation over the set of complex numbers. Graphing calculators will be used for solving and for confirming the algebraic solutions. 	Not covered
<ul style="list-style-type: none"> • AII/T.7 The student will solve equations containing rational expressions and equations containing radical expressions algebraically and graphically. Graphing calculators will be used for solving and for confirming the algebraic solutions. 	PSAT/NMSQT SAT I: Math
<ul style="list-style-type: none"> • AII/T.8 The student will recognize multiple representations of functions (linear, quadratic, absolute value, step, and exponential functions) and convert between a graph, a table, and symbolic form. A transformational approach to graphing will be employed through the use of graphing calculators. 	Not covered
<ul style="list-style-type: none"> • AII/T.9 The student will find the domain, range, zeros, and inverse of a function; the value of a function for a given element in its domain; and the composition of multiple functions. Functions will include exponential, logarithmic, and those that have domains and ranges that are limited and/or discontinuous. The graphing calculator will be used as a tool to assist in investigation of functions. 	Not covered
<ul style="list-style-type: none"> • AII/T.10 The student will investigate and describe through the use of graphs the relationships between the solution of an equation, zero of a function, x-intercept of a graph, and factors of a polynomial expression. 	Not covered
<ul style="list-style-type: none"> • AII/T.11 The student will use matrix multiplication to solve practical problems. Graphing calculators or computer programs with matrix capabilities will be used to find the product. 	PSAT/NMSQT

Virginia Learning Standards for Mathematics Content Standard	Covered by
<ul style="list-style-type: none"> • AII/T.12 The student will represent problem situations with a system of linear equations and solve the system, using the inverse matrix method. Graphing calculators or computer programs with matrix capability will be used to perform computations. 	SAT I: Math
<ul style="list-style-type: none"> • AII/T.13 The student will solve practical problems, using systems of linear inequalities and linear programming, and describe the results both orally and in writing. A graphing calculator will be used to facilitate solutions to linear programming problems. 	SAT I: Math
<ul style="list-style-type: none"> • AII/T.14 The student will solve nonlinear systems of equations, including linear-quadratic and quadratic-quadratic, algebraically and graphically. The graphing calculator will be used as a tool to visualize graphs and predict the number of solutions. 	Not covered
<ul style="list-style-type: none"> • AII/T.15 The student will recognize the general shape of polynomial, exponential, and logarithmic functions. The graphing calculator will be used as a tool to investigate the shape and behavior of these functions. 	Not covered
<ul style="list-style-type: none"> • AII/T.16 The student will investigate and apply the properties of arithmetic and geometric sequences and series to solve practical problems, including writing the first n terms, finding the nth term, and evaluating summation formulas. Notation will include E and a^n. 	PSAT/NMSQT SAT I: Math
<ul style="list-style-type: none"> • AII/T.17 The student will perform operations on complex numbers and express the results in simplest form. Simplifying results will involve using patterns of the powers of i. 	Not covered
<ul style="list-style-type: none"> • AII/T.18 The student will identify conic sections (circle, ellipse, parabola, and hyperbola) from his/her equations. Given the equations in (h, k) form, the student will sketch graphs of conic sections, using transformations. 	Not covered
<ul style="list-style-type: none"> • AII/T.19 The student will collect and analyze data to make predictions and solve practical problems. Graphing calculators will be used to investigate scatterplots and to determine the equation for a curve of best fit. Models will include linear, quadratic, exponential, and logarithmic functions. 	Not covered
<ul style="list-style-type: none"> • AII/T.20 The student will identify, create, and solve practical problems involving inverse variation and a combination of direct and inverse variations. 	Not covered
<ul style="list-style-type: none"> • AII/T.21 The student will use the definitions of the six trigonometric functions to find the sine, cosine, tangent, cotangent, secant, and cosecant of an angle in standard position, given a point, other than the origin, on the terminal side of the angle. Circular function definitions will be connected with trigonometric function definitions. 	Not covered
<ul style="list-style-type: none"> • AII/T.22 The student, given the value of one trigonometric function, will find the values of the other trigonometric functions. Properties of the unit circle and definitions of circular functions will be applied. 	Not covered
<ul style="list-style-type: none"> • AII/T.23 The student will find without the aid of a calculating utility the values of the trigonometric functions of the special angles and their related angles as found in the unit circle. This will include converting radians to degrees and vice versa. 	Not covered
<ul style="list-style-type: none"> • AII/T.24 The student will find with the aid of a calculator the value of any trigonometric function and inverse trigonometric function. 	Not covered

Virginia Learning Standards for Mathematics Content Standard	Covered by
<ul style="list-style-type: none"> • AII/T.25 The student will verify basic trigonometric identities and make substitutions, using the basic identities. 	Not covered
Mathematics -- Grade Level: 9 - 12	
Algebra II and Trigonometry	
AII/T.26 The student, given one of the six trigonometric functions in standard form (e.g., $y = A \sin (Bx + C) + D$, where A, B, C, and D are real numbers), will	Not covered
<ul style="list-style-type: none"> • AII/T.26 a) state the domain and the range of the function. 	Not covered
<ul style="list-style-type: none"> • AII/T.26 b) determine the amplitude, period, phase shift, and vertical shift. 	Not covered
<ul style="list-style-type: none"> • AII/T.26 c) sketch the graph of the function by using transformations for at least a one-period interval. 	Not covered
Mathematics -- Grade Level: 9 - 12	
Algebra II and Trigonometry	
<ul style="list-style-type: none"> • AII/T.27 The student will identify the domain and range of the inverse trigonometric functions and recognize the graphs of these functions. Restrictions on the domains of the inverse trigonometric functions will be included. 	Not covered
<ul style="list-style-type: none"> • AII/T.28 The student will solve trigonometric equations that include both infinite solutions and restricted domain solutions and solve basic trigonometric inequalities. Graphing utilities will be used to solve equations, check for reasonableness of results, and verify algebraic solutions. 	Not covered
<ul style="list-style-type: none"> • AII/T.29 The student will identify, create, and solve practical problems involving triangles. Techniques will include using the trigonometric functions, the Pythagorean Theorem, the Law of Sines, and the Law of Cosines. 	PSAT/NMSQT SAT I: Math
Mathematics -- Grade Level: 9 - 12	
Computer Mathematics	
<ul style="list-style-type: none"> • COM.1 The student will apply programming techniques and skills to solve practical problems in mathematics arising from consumer, business, other applications in mathematics. Problems will include opportunities for students to analyze data in charts, graphs, and tables and to use their knowledge of equations, formulas, and functions to solve these problems. 	Not covered
<ul style="list-style-type: none"> • COM.2 The student will design, write, test, debug, and document a program. Programming documentation will include pre-conditions and post-conditions of program segments, input/output specifications, the step-by-step plan, the test data, a sample run, and the program listing with appropriately placed comments. 	Not covered
<ul style="list-style-type: none"> • COM.3 The student will write program specifications that define the constraints of a given problem. These specifications will include descriptions of pre-conditions, post-conditions, the desired output, analysis of the available input, and an indication as to whether or not the problem is solvable under the given conditions. 	Not covered
<ul style="list-style-type: none"> • COM.4 The student will design a step-by-step plan (algorithm) to solve a given problem. The plan will be in the form of a program flowchart, pseudo code, hierarchy chart, and/or data-flow diagram. 	Not covered

Virginia Learning Standards for Mathematics Content Standard	Covered by
<ul style="list-style-type: none"> • COM.5 The student will divide a given problem into manageable sections (modules) by task and implement the solution. The modules will include an appropriate user-defined function, subroutines, and procedures. Enrichment topics might include user-defined libraries (units) and object-oriented programming. 	Not covered
<ul style="list-style-type: none"> • COM.6 The student will design and implement the input phase of a program, which will include designing screen layout and getting information into the program by way of user interaction, data statements, and/or file input. The input phase also will include methods of filtering out invalid data (error trapping). 	Not covered
<ul style="list-style-type: none"> • COM.7 The student will design and implement the output phase of a computer program, which will include designing output layout, accessing a variety of output devices, using output statements, and labeling results. 	Not covered
<ul style="list-style-type: none"> • COM.8 The student will design and implement computer graphics, which will include topics appropriate for the available programming environment as well as student background. Students will use graphics as an end in itself, as an enhancement to other output, and as a vehicle for reinforcing programming techniques. 	Not covered
<ul style="list-style-type: none"> • COM.9 The student will define simple variable data types that include integer, real (fixed and scientific notation), character, string, and Boolean. 	Not covered
<ul style="list-style-type: none"> • COM.10 The student will use appropriate variable data types, including integer, real (fixed and scientific notation), character, string, and Boolean. This will also include variables representing structured data types. 	Not covered
<ul style="list-style-type: none"> • COM.11 The student will describe the way the computer stores, accesses, and processes variables, including the following topics: the use of variables versus constants, variables addresses, pointers, parameter passing, scope of variables, and local versus global variables. 	Not covered
<ul style="list-style-type: none"> • COM.12 The student will translate a mathematical expression into a computer statement, which involves writing assignment statements and using the order of operations. 	Not covered
<ul style="list-style-type: none"> • COM.13 The student will select and implement built-in (library) functions in processing data. 	Not covered
<ul style="list-style-type: none"> • COM.14 The student will implement conditional statements that include "if/then" statements, "if/then/else" statements, case statements, and Boolean logic. 	Not covered
<ul style="list-style-type: none"> • COM.15 The student will implement loops, including iterative loops. Other topics will include single entry point, single exit point, pre-conditions, and post-conditions. 	Not covered
<ul style="list-style-type: none"> • COM.16 The student will select and implement appropriate data structures, including arrays (one-dimensional and/or multidimensional), files, and records. Implementation will include creating the data structure, putting information into the structure, and retrieving information from the structure. 	Not covered
<ul style="list-style-type: none"> • COM.17 The student will implement pre-existing algorithms, including sort routines, search routines, and simple animation routines. 	Not covered
<ul style="list-style-type: none"> • COM.18 The student will test a program, using an appropriate set of data. The set of test data should be appropriate and complete for the type of program being tested. 	Not covered
<ul style="list-style-type: none"> • COM.19 The student will debug a program, using appropriate techniques (e.g., appropriately placed controlled breaks, the printing of intermediate results, and other debugging tools available in the programming environment), and identify the difference between syntax errors and logic errors. 	Not covered

Virginia Learning Standards for Mathematics Content Standard	Covered by
<ul style="list-style-type: none"> • COM.20 The student will design, write, test, debug, and document a complete structured program that requires the synthesis of many of the concepts contained in previous standards. 	Not covered
Mathematics – Grade Level: 9 - 12	
Probability and Statistics	
<ul style="list-style-type: none"> • PS.1 The student will analyze graphical displays of data, including dotplots, stemplots, and histograms, to identify and describe patterns and departures from patterns, using central tendency, spread, clusters, gaps, and outliers. Appropriate technology will be used to create graphical displays. 	Not covered
<ul style="list-style-type: none"> • PS.2 The student will analyze numerical characteristics of univariate data sets to describe patterns and departures from patterns, using mean, median, mode, variance, standard deviation, interquartile range, range, and outliers. Appropriate technology will be used to calculate statistics. 	Not covered
<ul style="list-style-type: none"> • PS.3 The student will compare distributions of two or more univariate data sets, analyzing center and spread (within group and between group variations), clusters and gaps, shapes, outliers, or other unusual features. Appropriate technology will be used to generate graphical displays. 	Not covered
<ul style="list-style-type: none"> • PS.4 The student will analyze scatterplots to identify and describe the relationship between two variables, using shape; strength of relationship; clusters; positive, negative, or no association; outliers; and influential points. Appropriate technology will be used to generate scatterplots and identify outliers and influential points. 	Not covered
<ul style="list-style-type: none"> • PS.5 The student will find and interpret linear correlation, use the method of least squares regression to model the linear relationship between two variables, and use the residual plots to assess linearity. Appropriate technology will be used to compute correlation coefficients and residual plots. 	Not covered
<ul style="list-style-type: none"> • PS.6 The student will make logarithmic and power transformations to achieve linearity. Appropriate technology will be used. 	Not covered
<ul style="list-style-type: none"> • PS.7 The student, using two-way tables, will analyze categorical data to describe patterns and departure from patterns and to find marginal frequency and relative frequencies, including conditional frequencies. 	Not covered
<ul style="list-style-type: none"> • PS.8 The student will describe the methods of data collection in a census, sample survey, experiment, and observational study and identify an appropriate method of solution for a given problem setting. 	Not covered
<ul style="list-style-type: none"> • PS.9 The student will plan and conduct a survey. The plan will address sampling techniques (e.g., simple random and stratified) and methods to reduce bias. 	Not covered
<ul style="list-style-type: none"> • PS.10 The student will plan and conduct an experiment. The plan will address control, randomization, and measurement of experimental error. 	Not covered
<ul style="list-style-type: none"> • PS.11 The student will compute and distinguish between permutations and combinations and use technology for applications. 	PSAT/NMSQT SAT I: Math
<ul style="list-style-type: none"> • PS.12 The student will identify and describe two or more events as complementary, dependent, independent, and/or mutually exclusive. 	Not covered
<ul style="list-style-type: none"> • PS.13 The student will find probabilities (relative frequency and theoretical), including conditional probabilities for events that are either dependent or independent, by applying the "law of large numbers" concept, the addition rule, and the multiplication rule. 	SAT I: Math

Virginia Learning Standards for Mathematics Content Standard	Covered by
<ul style="list-style-type: none"> • PS.14 The student will develop, interpret, and apply the binomial probability distribution for discrete random variables, including computing the mean and standard deviation for the binomial variable. 	SAT I: Math
<ul style="list-style-type: none"> • PS.15 The student will simulate probability distributions, including binomial and geometric. 	SAT I: Math
<ul style="list-style-type: none"> • PS.16 The student will identify random variables as independent or dependent and find the mean and standard deviations for sums and differences of independent random variables. 	Not covered
<ul style="list-style-type: none"> • PS.17 The student will identify properties of a normal distribution and apply the normal distribution to determine probabilities, using a table or graphing calculator. 	Not covered
<ul style="list-style-type: none"> • PS.18 The student, given data from a large sample, will find and interpret point estimates and confidence intervals for parameters. The parameters will include proportion and mean, difference between two proportions, and difference between two means (independent and paired). 	Not covered
<ul style="list-style-type: none"> • PS.19 The student will apply and interpret the logic of a hypothesis-testing procedure. Tests will include large sample test for proportion, mean, difference between two proportions, and difference between two means (independent and paired) and Chi-squared test for goodness of fit, homogeneity of proportions, and independence. 	Not covered
<ul style="list-style-type: none"> • PS.20 The student will identify the meaning of sampling distribution with reference to random variable, sampling statistic, and parameter and explain the Central Limit Theorem. This will include sampling distribution of a sample proportion, a sample mean, a difference between two sample proportions, and a difference between two sample means. 	Not covered
<ul style="list-style-type: none"> • PS.21 The student will identify properties of a t-distribution and apply t-distributions to single-sample and two-sample (independent and matched pairs) t-procedures, using tables or graphing calculators. 	Not covered
Mathematics – Grade Level: 9 - 12	
Discrete Mathematics	
<ul style="list-style-type: none"> • DM.1 The student will model problems, using vertex-edge graphs. The concepts of valence, connectedness, paths, planarity, and directed graphs will be investigated. Adjacency matrices and matrix operations will be used to solve problems (e.g., food chains, number of paths). 	Not covered
<ul style="list-style-type: none"> • DM.2 The student will solve problems through investigation and application of circuits, cycles, Euler Paths, Euler Circuits, Hamilton Paths, and Hamilton Circuits. Optimal solutions will be sought using existing algorithms and student-created algorithms. 	Not covered
<ul style="list-style-type: none"> • DM.3 The student will apply graphs to conflict-resolution problems, such as map coloring, scheduling, matching, and optimization. Graph coloring and chromatic number will be used. 	Not covered
<ul style="list-style-type: none"> • DM.4 The student will apply algorithms, such as Kruskal's, Prim's, or Dijkstra's, relating to trees, networks, and paths. Appropriate technology will be used to determine the number of possible solutions and generate solutions when a feasible number exists. 	Not covered
<ul style="list-style-type: none"> • DM.5 The student will use algorithms to schedule tasks in order to determine a minimum project time. The algorithms will include critical path analysis, the list-processing algorithm, and student-created algorithms. 	Not covered
<ul style="list-style-type: none"> • DM.6 The student will solve linear programming problems. Appropriate technology will be used to facilitate the use of matrices, graphing techniques, and the Simplex method of determining solutions. 	Not covered

Virginia Learning Standards for Mathematics Content Standard	Covered by
<ul style="list-style-type: none"> DM.7 The student will analyze and describe the issue of fair division (e.g., cake cutting, estate division). Algorithms for continuous and discrete cases will be applied. 	Not covered
<ul style="list-style-type: none"> DM.8 The student will investigate and describe weighted voting and the results of various election methods. These may include approval and preference voting as well as plurality, majority, run-off, sequential run-off, Borda count, and Condorcet winners. 	Not covered
<ul style="list-style-type: none"> DM.9 The student will identify apportionment inconsistencies that apply to issues such as salary caps in sports and allocation of representatives to Congress. Historical and current methods will be compared. 	Not covered
<ul style="list-style-type: none"> DM.10 The student will use the recursive process and difference equations with the aid of appropriate technology to generate a) compound interest; b) sequences and series; c) fractals; d) population growth models; e) the Fibonacci sequence. 	Not covered
<ul style="list-style-type: none"> DM.11 The student will describe and apply sorting algorithms and coding algorithms used in storing, processing, and communicating information. These will include a) bubble sort, merge sort, and network sort; b) ISBN, UPC, Zip, and banking codes. 	Not covered
<ul style="list-style-type: none"> DM.12 The student will select, justify, and apply an appropriate technique to solve a logic problem. Techniques will include Venn diagrams, truth tables, and matrices. 	Not covered
<ul style="list-style-type: none"> DM.13 The student will apply the formulas of combinatorics in the areas of a) the Fundamental (Basic) Counting Principle; b) knapsack and bin-packing problems; c) permutations and combinations; d) the pigeonhole principle. 	Not covered
Mathematics – Grade Level: 9 - 12	
Mathematical Analysis	
<ul style="list-style-type: none"> MA.1 The student will investigate and identify the characteristics of polynomial and rational functions and use these to sketch the graphs of the functions. This will include determining zeros, upper and lower bounds, y-intercepts, symmetry, asymptotes, intervals for which the function is increasing or decreasing, and maximum or minimum points. Graphing utilities will be used to investigate and verify these characteristics. 	Not covered
<ul style="list-style-type: none"> MA.2 The student will find compositions of functions and inverses of functions. Analytical methods and graphing utilities will be used to investigate and verify the domain and range of resulting functions. 	Not covered
<ul style="list-style-type: none"> MA.3 The student will investigate and describe the continuity of functions, using graphs. The functions will include absolute value, piecewise, and step functions. 	Not covered
<ul style="list-style-type: none"> MA.4 The student will expand binomials having positive integral exponents through the use of the Binomial Theorem, the formula for combinations, and Pascal's Triangle. 	Not covered
<ul style="list-style-type: none"> MA.5 The student will solve practical problems involving arithmetic and geometric sequences and series. This will include finding the sum (sigma notation included) of finite and infinite convergent series that will lead to an intuitive approach to a limit. 	PSAT/NMSQT SAT I: Math
<ul style="list-style-type: none"> MA.6 The student will use mathematical induction to prove formulas/statements. 	SAT I: Math

Virginia Learning Standards for Mathematics Content Standard	Covered by
<ul style="list-style-type: none"> MA.7 The student will find the limit of an algebraic function, if it exists, as the variable approaches either a finite number or infinity. A graphing utility will be used to verify intuitive reasoning, algebraic methods, and numerical substitution. 	Not covered
<ul style="list-style-type: none"> MA.8 The student will investigate and identify the characteristics of conic section equations in (h, k) forms. The techniques of translation and rotation of axes in the coordinate plane will be used to graph conic sections. 	Not covered
<ul style="list-style-type: none"> MA.9 The student will investigate and identify the characteristics of exponential and logarithmic functions in order to graph these functions and solve equations and practical problems. This will include the role of e, natural and common logarithms, laws of exponents and logarithms, and the solution of logarithmic and exponential equations. Graphing utilities will be used to investigate and verify the graphs and solutions. 	Not covered
<ul style="list-style-type: none"> MA.10 The student will investigate and identify the characteristics of the graphs of polar equations, using graphing utilities. This will include classification of polar equations, the effects of changes in the parameters in polar equations, conversion of complex numbers from rectangular form to polar form and vice versa, and the intersection of the graphs of polar equations. 	Not covered
<ul style="list-style-type: none"> MA.11 The student will perform operations with vectors in the coordinate plane and solve practical problems using vectors. This will include the following topics: operations of addition, subtraction, scalar multiplication, and inner (dot) product; norm of a vector; unit vector; graphing; properties; simple proofs; complex numbers (as vectors); and perpendicular components. 	Not covered
<ul style="list-style-type: none"> MA.12 The student will use parametric equations to model and solve application problems. Graphing utilities will be used to develop an understanding of the graph of parametric equations. 	Not covered
<ul style="list-style-type: none"> MA.13 The student will identify, create, and solve practical problems involving triangles. Techniques will include using the trigonometric functions, the Pythagorean Theorem, the Law of Sines, and the Law of Cosines. 	PSAT/NMSQT SAT I: Math
Mathematics -- Grade Level: 9 - 12	
Advanced Placement Calculus	
<ul style="list-style-type: none"> APC.1 The student will define and apply the properties of elementary functions, including algebraic, trigonometric, exponential, and composite functions and their inverses, and graph these functions, using a graphing calculator. Properties of functions will include domains, ranges, combinations, odd, even, periodicity, symmetry, asymptotes, zeros, upper and lower bounds, and intervals where the function is increasing or decreasing. 	Not covered
<ul style="list-style-type: none"> APC.2 The student will define and apply the properties of limits of functions. Limits will be evaluated graphically and algebraically. This will include a) limits of a constant b) limits of a sum, product, and quotient c) one-sided limits d) limits at infinity, infinite limits, and non-existent limits <p>AP Calculus BC will include l'Hopital's Rule, which will be used to find the limit of functions whose limits yield the indeterminate forms: 0/0 and infinity divided by infinity.</p>	Not covered

Virginia Learning Standards for Mathematics Content Standard	Covered by
<ul style="list-style-type: none"> • APC.3 The student will use limits to define continuity and determine where a function is continuous or discontinuous. This will include a) continuity in terms of limits; b) continuity at a point and over a closed interval; c) application of the Intermediate Value Theorem and the Extreme Value Theorem; d) geometric understanding and interpretation of continuity and discontinuity 	Not covered
<ul style="list-style-type: none"> • APC.4 The student will investigate asymptotic and unbounded behavior in functions. This will include a) describing and understanding asymptotes in terms of graphical behavior and limits involving infinity; b) comparing relative magnitudes of functions and their rates of change 	Not covered
<ul style="list-style-type: none"> • APC.5 The student will investigate derivatives presented in graphic, numerical, and analytic contexts and the relationship between continuity and differentiability. The derivative will be defined as the limit of the difference quotient and interpreted as an instantaneous rate of change. 	Not covered
<ul style="list-style-type: none"> • APC.6 The student will investigate the derivative at a point on a curve. This will include a) finding the slope of a curve at a point, including points at which the tangent is vertical and points at which there are no tangents; b) using local linear approximation to find the slope of a tangent line to a curve at the point; c) defining instantaneous rate of change as the limit of average rate of change; d) approximating rate of change from graphs and tables of values 	Not covered
Mathematics – Grade Level: 9 - 12	
Advanced Placement Calculus	
APC.7 The student will analyze the derivative of a function as a function in itself. This will include	
<ul style="list-style-type: none"> • A) comparing corresponding characteristics of the graphs of f, f', and f'' 	
<ul style="list-style-type: none"> • B) defining the relationship between the increasing and decreasing behavior of f and the sign of f' 	Not covered
<ul style="list-style-type: none"> • C) translating verbal descriptions into equations involving derivatives and vice versa 	Not covered
<ul style="list-style-type: none"> • D) analyzing the geometric consequences of the Mean Value Theorem 	Not covered
<ul style="list-style-type: none"> • E) defining the relationship between the concavity of f and the sign of f'' 	Not covered
<ul style="list-style-type: none"> • F) identifying points of inflection as places where concavity changes and finding points of inflection 	Not covered
Mathematics – Grade Level: 9 - 12	Not covered
Advanced Placement Calculus	Not covered
APC.8 The student will apply the derivative to solve problems. This will include	Not covered
<ul style="list-style-type: none"> • A) analysis of curves and the ideas of concavity and monotonicity 	Not covered
<ul style="list-style-type: none"> • B) optimization involving global and local extrema 	Not covered
<ul style="list-style-type: none"> • C) modeling of rates of change and related rates 	Not covered
<ul style="list-style-type: none"> • D) use of implicit differentiation to find the derivative of an inverse function 	Not covered
<ul style="list-style-type: none"> • E) interpretation of the derivative as a rate of change in applied contexts, including velocity, speed, and acceleration 	Not covered
<ul style="list-style-type: none"> • F) differentiation of nonlogarithmic functions, using the technique of logarithmic differentiation 	Not covered
Mathematics – Grade Level: 9 - 12	
Advanced Placement Calculus	
APC.8 The student will apply the derivative to solve problems. This will include	

Virginia Learning Standards for Mathematics Content Standard	Covered by
AP Calculus BC will also apply the derivative to solve problems. This will include	
• A) analysis of planar curves given in parametric form, polar form, and vector form, including velocity and acceleration vectors	Not covered
• B) numerical solution of differential equations, using Euler's method	Not covered
• C) l'Hopital's Rule to test the convergence of improper integrals and series	Not covered
• D) geometric interpretation of differential equations via slope fields and the relationship between slope fields and the solution curves for the differential equations	Not covered
Mathematics -- Grade Level: 9 - 12	
Advanced Placement Calculus	
APC.9 The student will apply formulas to find derivatives. This will include	
• A) derivatives of algebraic, trigonometric, exponential, logarithmic, and inverse trigonometric functions	Not covered
• B) derivations of sums, products, quotients, inverses, and composites (chain rule) of elementary functions	Not covered
• C) derivatives of implicitly defined functions	Not covered
• D) higher order derivatives of algebraic, trigonometric, exponential, and logarithmic, functions	Not covered
• AP Calculus BC will also include finding derivatives of parametric, polar, and vector functions.	Not covered
Mathematics -- Grade Level: 9 - 12	
Advanced Placement Calculus	
• APC.10 The student will use Riemann sums and the Trapezoidal Rule to approximate definite integrals of functions represented algebraically, graphically, and by a table of values and will interpret the definite integral as the accumulated rate of change of a quantity over an interval interpreted as the change of the quantity over the interval $b(a) - f(a)$. a Riemann sums will use left, right, and midpoint evaluation points over equal subdivisions.	Not covered
• APC.11 The student will find antiderivatives directly from derivatives of basic functions and by substitution of variables (including change of limits for definite integrals).	Not covered
• APC.11 AP Calculus BC will also include finding antiderivatives by parts and simple partial fractions (nonrepeating linear factors only), and finding improper integrals as limits of definite integrals.	Not covered
• APC.11 AP Calculus BC will also solve logistic differential equations and use them in modeling.	Not covered
• APC.12 The student will identify the properties of the definite integral. This will include additivity and linearity, the definite integral as an area, and the definite integral as a limit of a sum as well as the fundamental theorem	Not covered
• APC.13 The student will use the Fundamental Theorem of Calculus to evaluate definite integrals, represent a particular antiderivative, and facilitate the analytical and graphical analysis of functions so defined.	Not covered
• APC.14 The student will find specific antiderivatives, using initial conditions (including applications to motion along a line). Separable differential equations will be solved and used in modeling (in particular, the equation $y' = ky$ and exponential growth).	Not covered

Virginia Learning Standards for Mathematics Content Standard	Covered by
<ul style="list-style-type: none"> • APC.15 The student will use integration techniques and appropriate integrals to model physical, biological, and economic situations. The emphasis will be on using the integral of a rate of change to give accumulated change or on using the method of setting up an approximating Riemann sum and representing its limit as a definite integral. Specific applications will include a) the area of a region; b) the volume of a solid with known cross-section; c) the average value of a function; d) the distance traveled by a particle along a line. AP Calculus BC will include finding the area of a region (including a region bounded by polar curves) and finding the length of a curve (including a curve given in parametric form). 	Not covered
<ul style="list-style-type: none"> • APC.16 The student will define a series and test for convergence of a series in terms of the limit of the sequence of partial sums. This will include a) geometric series with applications; b) harmonic series; c) alternating series with error bound; d) terms of series as areas of rectangles and their relationship to improper integrals, including the integral test and its use in testing the convergence of p-series; e) ratio test for convergence and divergence. (For those students who are enrolled in AP Calculus BC.) 	Not covered
<ul style="list-style-type: none"> • APC.17 The student will define, restate, and apply Taylor series. This will include a) Taylor polynomial approximations with graphical demonstration of convergence; b) Maclaurin series and the general Taylor series centered at $x = a$; c) Maclaurin series for the functions e^x, $\sin x$, $\cos x$, and $1/(1 - x)$; d) formal manipulation of Taylor series and shortcuts to computing Taylor series, including substitution, differentiation, antidifferentiation, and the formation of new series from known series; e) functions defined by power series; f) radius and interval of convergence of power series; g) Lagrange error bound of a Taylor polynomial. (For those students who are enrolled in AP Calculus BC.) 	Not covered